Bosch PU (BUEP19)

Table of Contents

5.7 Bosch PU BUEP19 ..... 5.7-3
5.7.1 General Information 5.7-3
5.7.2 Technical Description 5.7-4
5.7.3 Protocol Parameters BUEP19 ..... 5.7-4
5.7.3.1 Parameter Target Module 5.7-4
5.7.3.2 Parameter Block Check 5.7-4
5.7.3.3 Parameter Coordination Flag 5.7-4
5.7.4 Data Type Structure 5.7-5
5.7.4.1 Data Types 5.7-5
5.7.5 Additional Functions 5.7-6
5.7.6 Physical Interfacing 5.7-7
5.7.6.1 Connecting Cable TTY / 20 mA - Bosch PU 5.7-8
5.7.6.2 Connecting Cable Universal Interface SER1 TTY / 20 mA - Bosch PU 5.7-9
5.7.7 Error Messages 5.7-10

/000-0333/ © Copyright by Sütron electronic GmbH
TESI_T_eng_V20.3005070QK0

Bosch PU (BUEP19)

5.7 Bosch PU BUEP19

5.7.1 General Information

The operating terminals allow for a simple connection to the Bosch PLCs.
The operating terminal is connected to the respective PLC-module.

The data communication on the interface is handled by the PU protocol BUEP19. Communication via the BUEP19 protocol is possible with the CPU types ZE300 / ZE301 / R300 / R300B / R600 / R600B.

The software components of the system are fully adapted to the parameters and marginal conditions of the PU interface.

This offers the user the following advantages:

- Random write and read access to any data within the PLC. Data of existing PLC programs can be displayed and modified directly in the operating terminal. It is not necessary to adapt the PLC program to the operating terminal in any respect since it is not required that communications data be stored in a specified address area or data type area.

- The operating terminal automatically polls the freely definable data areas for cyclic data.

- No configuration required within the PLC.

- The PU protocol is handled entirely by the firmware of the PLC. A PLC program (function blocks, etc.) in the PLC is not required for the handling of the communication.

- The protocol provides error control. Transmission errors are detected and, if possible, eliminated by repeating the transmission. An electrically isolated, noise-immune interface hardware in accordance with the 20 mA current loop interface standard permits the application even in a harsh industrial environment.

- The parameters of the interface SER1 are assigned in the programming software in a protocol-specific manner and are stored in the application description. Modifying of the parameters is also possible in the setup mask or each other I/O mask of the terminal at any time.

- The programming system provides a maximum of support to the operator in programming the operating terminal. The definitions (abbreviations) used here are identical with the definitions used within the PLC program.

/000-0333/ © Copyright by Sütron electronic GmbH
TESI_T_eng_V20.3005070QK0

5.7.2 Technical Description

The interfacing of the operating terminal to the Bosch PLCs is effected by means of the BUEP19 PU-protocol.

The PU protocol BUEP19 allows random read and write access to all PLC data. Any byte-structured data types can also be accessed in bit-mode. The size of the address area depends on the respective PLC.

A read access must occur, before individual bits or bytes of a flag word can be accessed for a write operation. Subsequently, a write access is possible to the entire data structure. When accessing individual bits or bytes, special care must be taken to ensure that neither the terminal nor the PLC modify individual bits within one byte (or individual bits within one word, respectively).

5.7.3 Protocol Parameters BUEP19

The operating terminal adapts to the default parameters of the PU interface. It is therefore **not** necessary to modify the interface parameters in the PLC.
To ensure a proper communication, the parameters must **not** be modified.

Baud rate: 300, 600, 1200, 2400, 4800, 9600, **19200**, 38400, 375000, 500000 Baud
Parity: none, **even**, odd
Data bits: 5, 6, 7, **8**
Stop bits: **1**, 1.5, 2
Handshake: **no handshake**, hardware handshake, software handshake

The default settings are printed in **bold**.

5.7.3.1 Parameter Target Module

To ensure an error-free data transmission, the terminal must be informed of which module is to be connected to interface SER1.
ZE300 / ZE301
R300 / R300B
R600 / R600B

5.7.3.2 Parameter Block Check

As a default, the protocol BUEP19 implements the data block check method CRC16.
The programming device uses a data block check method in accordance with LRC8.
To avoid difficulties during the development phase during which the PU and the terminal are alternately connected to the PLC, the terminal allows selection of the block check method LRC8.

5.7.3.3 Parameter Coordination Flag

The protocol permits defining of a coordination flag.

5.7.4 Data Type Structure

a) Alphanumerical Text
Is stored in the memory byte for byte in ascending address order.

b) Counter
The count value is interpreted in binary format. The maximum value is 8191.

c) Timer
Timer functions consist of a time value and a time base. The terminal operates with imaginary unsigned 4-byte variables, even though the data stored in the PLC comprise only 2 bytes.
When read-accessing the timer, the terminal converts the time value and time base into a terminal-internal unsigned 4-byte number, which represents the time value in reference to the time base of 0.01 second.
Example: A range of 10 (time base is 1.0 second) and a time value of 999, are represented or edited, respectively, in the terminal by the value 99900. Scaling of this value to other value ranges is possible by specifying a factor and divisor within the variable definition.
Before writing a timer variable to the PLC, the time value and the smallest possible time base are formed from the terminal-internal unsigned 4-byte value.

d) Floating Point Numbers
The data are interpreted in the Siemens floating point format.

e) Binary Variables with a Length of 1, 2 or 4 Bytes
Data with a length of 2 bytes are interpreted in the PLC-conformal byte order for words.
Data with a length of 4 bytes are interpreted in the PLC-conformal byte order for long words.

5.7.4.1 Data Types

Direct accessing of the following data types is possible:

Type	Description	Access
E	Input	B, BY, W, DW
A	Output	B, BY, W, DW
M	Flag	B, BY, W, DW
D	Data Word (0 to 510)	W, DW
DP	Data Buffer (0 to 510 ; only ZE300)	W
T	Timer (R300 and R600 Read-only)	W
Z	Counter (R300 and R600 Read-only)	W

Table 5.7-1: Data types
The size of each data area is governed by the CPU of the PLC.

/000-0333/ © Copyright by Sütron electronic GmbH
TESI_T_eng_V20.3005070QK0

5.7.5 Additional Functions

In addition to the random write and read access to PLC variables, a memory area comprising 12 bytes is specified in the application description as poll area. The location of this memory area is specified in the application description.

Only marginal conditions regarding this memory area are that the PLC must be able to access in bit-mode and the terminal in **word-mode** and the memory area must be contiguous.

The addresses M, D or DP can be accessed in word-mode.

The data area comprises a maximum of 6 words or 12 bytes.

Example: The cyclic data area is set to DW21 in the programming system.

Word Address	Reference	High Byte	Low Byte
Word Address + 0	DW21	Write Coordination Byte	Reserved
Word Address + 1	DW22	Message Channel High Byte	Message Channel Low Byte
Word Address + 2	DW23	Function Keys LED 1 to 4	Function Keys LED 5 to 8
Word Address + 3	DW24	Function Keys LED 9 to 12	Function Keys LED 13 to 16
Word Address + 4	DW25	Function Keys LED 17 to 20	Function Keys LED 21 to 24
Word Address + 5	DW26	Function Keys LED 25 to 28	Function Keys LED 29 to 32

Table 5.7-2: Word structured poll area

5.7.6 Physical Interfacing

Pin	Designation	Function
1	Shield	Shielding
2	T+	Transmit Data, Positive Polarity
3	S1+	Power Source 1, Positive Polarity
4	R+	Receive Data, Positive Polarity
5	S2+	Power Source 2, Positive Polarity
6	T-	Transmit Data, Negative Polarity
7	S1-	Power Source 1, Negative Polarity
8	R-	Receive Data, Negative Polarity
9	S2-	Power Source 2, Negative Polarity

Table 5.7-3: Pin assignment X2 TTY / 20 mA

Pin	Designation	Function
10	T+	Transmit Data, Positive Polarity
12	S1+	Power Source 1, Positive Polarity
13	R+	Receive Data, Positive Polarity
14	R-	Receive Data, Negative Polarity
16	S2+	Power Source 2, Positive Polarity
19	T-	Transmit Data, Negative Polarity
21	S1-	Power Source 1, Negative Polarity
24	S2-	Power Source 2, Negative Polarity

Table 5.7-4: Pin assignment universal interface SER1 TTY / 20 mA

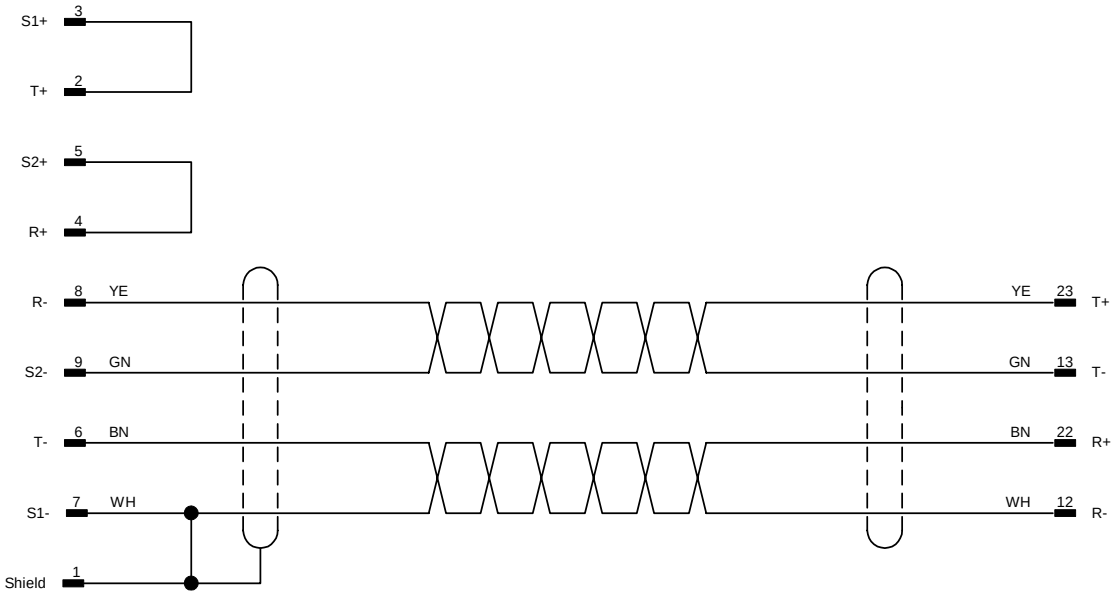
/000-0333/ © Copyright by Sütron electronic GmbH
TESI_T_eng_V20.3005070QK0

Bosch PU (BUEP19)

5.7.6.1 Connecting Cable TTY / 20 mA - Bosch PU

The following wiring diagram does not apply to terminals with universal interface.

TesiMod	Bosch PLC
Operating Terminal	e.g. ZE301
Transmitter active	Transmitter passive
Receiver active	Receiver passive



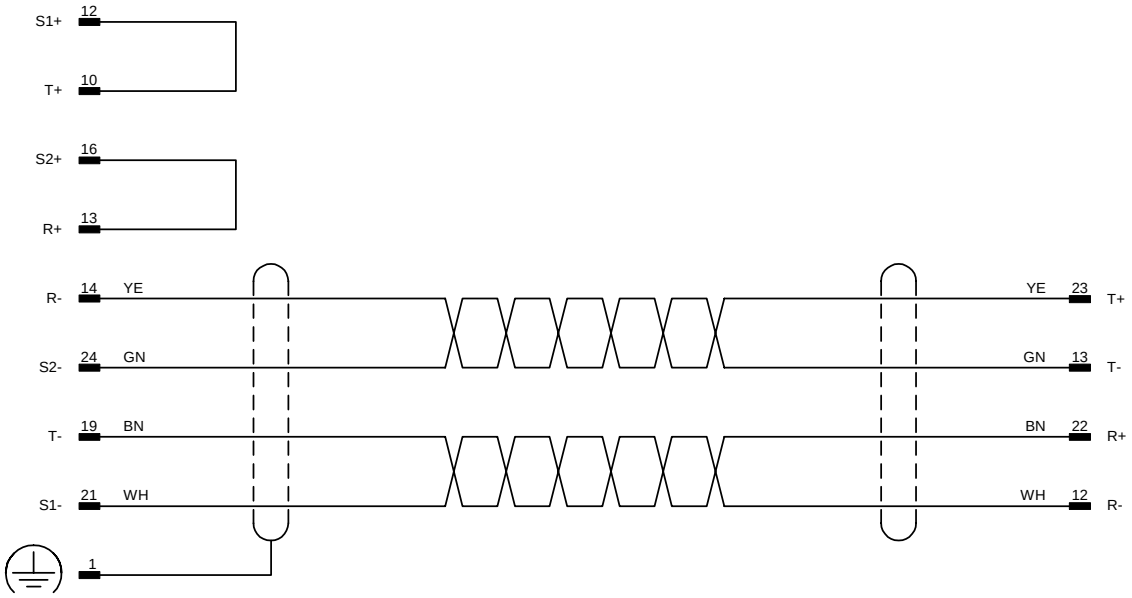
D-Subminiature	D-Subminiature
Male Connector	Male Connector
9-pin	25-pin

Each end of the shield is connected to the metallic enclosure.

5.7.6.2 Connecting Cable Universal Interface SER1 TTY / 20 mA - Bosch PU

The following wiring diagram applies to operating terminals with universal interface only.

TesiMod	Bosch PLC
Operating Terminal	e.g. ZE301
Transmitter active	Transmitter passive
Receiver active	Receiver passive



D-Subminiature	D-Subminiature
Male Connector	Male Connector
25-pin	25-pin

Each end of the shield is connected to the metallic enclosure.

/000-0333/ © Copyright by Sütron electronic GmbH
TESI_T_eng_V20.3005070QK0

5.7.7 Error Messages

Code	1	E_SLAVE_NOT_READY	Slave not ready
	2	E_PROTOKOL	Sequence of the packets
	3	E_FRAME	Character frame error
	4	E_TIMEOUT	Timeout error
	5	E_CRC_BCC	CRC error
	6	E_PARITY	Parity error
	7	E_SEND_ABORT	Abort send process
	8	E_REC_ABORT	Abort receive process
	9	E_BUF_SIZE	Insufficient cyclic buffer
	10	E_NO_DEFINE	No cyclic data defined
	12	E_DEFINE	Cyclic data already defined
	15	E_NO_PROTOCOL	Selected protocol is not supported
	16	E_OVERRUN	Receive buffer overrun
	40	E_SYS_ADDRESS	Undefined system variable

Bosch-specific error messages

	50	E_QUITTUNG_START	No communication setup
	51	E_QUITTUNG_OPEN	Incorrect acknowledge signal during communication setup
	52	E_QUITTUNG_DATA	Incorrect acknowledge signal to transmitted information block
	53	E_NO_RESPONSE_WRONG_CHAR	No response message
	54	E_TIMEOUT_NO_RESPONSE	Timeout - no response message
	55	E_TIMEOUT_BLOCKZEIT	Timeout - block time has been exceeded
	56	E_TIMEOUT_QUIT_RESPONSE	Timeout - no acknowledge signal
	57	E_ABBRUCH_SPS	EOT -PLC abort
	58	E_RECEIVE_COUNT	Number of received data is incorrect

PLC-Error

	62	E_WRONG_ORDER 32 from the PLC	write access to T, C, to module not permitted
	67	E_WRONG_PARAMETER 37 from the PLC	incorrect parameter

68 E_CHAR_COUNT
38 from the PLC ..... number of bytes received is incorrect accordance with the message header

69 E_SYSTEM
39 from the PLC ..... incorrect P1 in the system message

71 E_DIRECTION
41 from the PLC ..... direction not defined

72 E_DB_SHORT
42 from the PLC ..... DB too small

74 E_DB_NOT_PROG
44 from the PLC ..... DB not programmed

76 E_DB_NOT_DEF
46 from the PLC ..... DB not defined

78 E_WRONG_TYP
48 from the PLC ..... block type unknown

79 E_P2_NULL
49 from the PLC ..... parameter 2 is 0

94 E_TELE_TYP
64 from the PLC ..... message type incorrect

/000-0333/ © Copyright by Sütron electronic GmbH
TESI_T_eng_V20.3005070QK0

Bosch PU (BUEP19)